

CLAIMS

1. A system for assisting a driver operating a vehicle traveling on a road, the system comprising:

5 a device arrangement determining an obstacle as a target obstacle in a path of the vehicle and providing information on the target obstacle and width of the target obstacle;

a device detecting status of the vehicle;

10 a device determining a risk that the vehicle may come into contact with the target obstacle based on the information on the target obstacle and the detected status of the vehicle; and

a control arrangement regulating at least one of a reaction force input to the driver and a force applied to the vehicle based on the determined risk and the width of the target obstacle.

15 2. The system as recited in claim 1, wherein the control arrangement includes a controller that regulates the at least one of the reaction force input to the driver and the force applied to the vehicle in response to a control amount determined based on the determined risk.

20 3. The system as recited in claim 2, wherein the device arrangement includes a width measurement device that measures a width of the target obstacle, and the control arrangement includes a correction device that corrects the control amount based on the measured width of the target obstacle.

25 4. The system as recited in claim 3, wherein the force applied to the vehicle is at least one of a driving force and a braking force.

5. The system as recited in claim 3, wherein the smaller the width of the target obstacle, the smaller the correction of the control amount.

6. The system as recited in claim 3, wherein the correction device corrects the control amount based on the measured width upon determining that the vehicle is overtaking the target obstacle.

5 7. The system as recited in claim 3, wherein the correction device corrects the control amount based on the measured width and an overlap between the target obstacle and the path.

8. The system as recited in claim 1, wherein the control arrangement
10 regulates a reaction force from a driver controlled input device for longitudinal control of the vehicle.

9. The system as recited in claim 1, wherein the control arrangement
15 regulates a reaction force from a driver controlled input device for lateral control of the vehicle.

10. The system as recited in claim 9, wherein the driver controlled input device is a steering wheel.

20 11. The system as recited in claim 1, wherein the path of the vehicle is an estimated path.

12. The system as recited in claim 7, wherein the control amount is
25 variable with a gain, and wherein the correction device gradually increases the gain from a predetermined value as the overlap increases.

13. The system as recited in claim 7, wherein the control amount is
30 variable with a gain, and wherein the correction device gradually increases the gain from 0 (zero) as the overlap increases after exceeding a predetermined value.

14. The system as recited in claim 7, wherein the control amount is variable with a gain, and wherein the correction device gradually increases the gain from a predetermined value as the overlap varies in increasing direction after exceeding a predetermined value, but gradually decreases the gain to 0
5 (zero) as the overlap varies in decreasing direction.

15. A vehicle comprising:

a device arrangement determining an obstacle as a target obstacle in a path of the vehicle and providing information on the target obstacle and width
10 of the target obstacle;

a device detecting status of the vehicle;

a device determining a risk that the vehicle may come into contact with the target obstacle based on the information on the target obstacle and the detected status of the vehicle; and

15 a control arrangement regulating at least one of a reaction force input to the driver and a force applied to the vehicle based on the determined risk and the width of the target obstacle.

16. The vehicle as recited in claim 15, wherein the device arrangement
20 includes a width measurement device that measures a width of the target obstacle, and the control arrangement includes a controller that regulates the at least one of the reaction force input to the driver and the force applied to the vehicle in response to, a control amount determined based on the determined risk, and, and a correction device that corrects the control amount based on the
25 measured width of the target obstacle.

17. A method of assisting a driver operating a vehicle traveling on a road, the method comprising:

determining an obstacle as a target obstacle in a path of the vehicle and
30 providing information on the target obstacle and width of the target obstacle;

detecting status of the vehicle;

determining a risk that the vehicle may come into contact with the target obstacle based on the information on the target obstacle and the detected status of the vehicle; and

5 regulating at least one of a reaction force input to the driver and a force applied to the vehicle based on the determined risk and the width of the target obstacle.

18. The method as recited in claim 17, further comprising measuring the
10 width of the target obstacle; and wherein the step of regulating includes: regulating the at least one of the reaction force input to the driver and the force applied to the vehicle in response to a control amount determined based on the determined risk; and correcting the control amount based on the measured width of the target obstacle.

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19. A system for assisting a driver operating a vehicle traveling on a road, the system comprising:

means for determining an obstacle as a target obstacle in a path of the vehicle and providing information on the target obstacle and width of the target
20 obstacle;

means for detecting status of the vehicle;

means for determining a risk that the vehicle may come into contact with the target obstacle based on the information on the target obstacle and the detected status of the vehicle; and

25 means for regulating at least one of a reaction force input to the driver and a force applied to the vehicle based on the determined risk and the width of the target obstacle.

20. The system as recited in claim 19, further comprising means for
30 measuring the width of the target obstacle; and means for regulating includes:

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means for regulating the at least one of the reaction force input to the driver and the force applied to the vehicle in response to a control amount determined based on the determined risk; and means for correcting the control amount based on the measured width of the target obstacle.